

How Important Are Financing Constraints?

The role of finance in the business environment

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Abstract: What role does the business environment play in promoting and restraining firm growth? Recent literature points to a number of factors as obstacles to growth. Inefficient functioning of financial markets, inadequate security and enforcement of property rights, poor provision of infrastructure, inefficient regulation and taxation, and broader governance features such as corruption and macroeconomic stability are all discussed without any comparative evidence on their ordering. In this paper, we use firm level survey data to present evidence on the relative importance of different features of the business environment. We find that although firms report many obstacles to growth, not all the obstacles are equally constraining. Some affect firm growth only indirectly through their influence on other obstacles, or not at all. Using Directed Acyclic Graph (DAG) methodology as well as regressions, we find that only obstacles related to Finance, Crime and Policy Instability directly affect the growth rate of firms. Robustness tests further show that the Finance result is the most robust of the three. These results have important policy implications for the priority of reform efforts. Our results show that maintaining policy stability, keeping crime under control, and undertaking financial sector reforms to relax financing constraints are likely to be the most effective routes to promote firm growth.

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Understanding firm growth is at the heart of the development process, making it a much researched area in finance and economics. More recently, the field has seen resurgence in interest from policymakers and researchers, with a new focus on the broader business environment in which firms operate. Researchers have documented through surveys that firms report many features of their business environment as obstacles to their growth. Firms report being affected by inadequate security and enforcement of property rights, inefficient functioning of financial markets, poor provision of infrastructure services, inefficient regulations and taxation, and broader governance features such as corruption and macroeconomic instability. Many of these perceived obstacles are correlated with low performance.

These findings can inform government policies that shape the opportunities and incentives facing firms, by influencing their business environment. However, even if firm performance is likely to benefit from improvements in all dimensions of the business environment, addressing all of them at once would be challenging for any government. Thus, understanding how these different obstacles interact and which ones influence firm growth directly is important in prioritizing reform efforts. Further, since the relative importance of obstacles may also vary according to the level of development of the country and according to firm characteristics such as firm size, it is important to assess whether the same obstacles affect all sub-populations of firms.

In this paper we examine which features of the business environment directly affect firm growth. We use evidence from the World Business Environment Survey (WBES), a major firm level survey conducted by the World Bank in 1999 and 2000 in 80 developed and developing countries around the world. We use this data to assess (i)

whether each feature of the business environment that firms report as an obstacle affects their growth, (ii) the relative economic importance of the obstacles that do constrain firm growth, (iii) whether an obstacle has a direct effect on firm growth or whether the obstacle acts indirectly by reinforcing other obstacles which have a direct effect, and (iv) whether these relationships vary by different levels of economic development and different firm characteristics.

We define an obstacle to be binding if it has a significant impact on firm growth. Our regression results indicate that out of a full set of ten different business environment obstacles that firms report, only Finance, Crime, and Policy Instability emerge as the binding constraints with a direct association with firm growth. In order to reduce dimensionality of the different business environment factors in a systematic structured approach, we use the Directed Acyclic Graph (DAG) methodology implemented by an algorithm used in artificial intelligence and computer science (Sprites, Glymour, and Scheines (2000)). The DAG algorithm also confirms Finance, Crime and Policy Instability to be the binding constraints, with other obstacles having an indirect association, if at all, on firm growth through the binding constraints.

In further robustness tests, we find that the finance result is the most robust, in that the Finance obstacle is binding regardless of which countries and firms are included in the sample. Regression analysis also shows that the Finance obstacle has the largest direct effect on firm growth. These results are not due to influential observations, reverse causality or perception biases likely to be found in survey responses. Policy Instability and Crime, the other two binding constraints in the full sample, are driven by the inclusion of African and Transition economies where, arguably, they might be the most

problematic. Instrumental variable regressions also show Finance to be the most robust result.

We also find that the relative importance of different factors varies according to firm characteristics. Larger firms are affected by the Finance obstacle to a significantly lesser extent but being larger does not relax the obstacles related to Crime or Policy Instability to the same extent.

Examining the Finance obstacle in more detail, we find that although firms perceive many specific financing obstacles, such as lack of access to long-term capital and collateral requirements, only the cost of borrowing is directly associated with firm growth. However, we find that the cost of borrowing itself is affected by imperfections in the financial markets. Thus we find that the firms that face high interest rates are the ones that perceive banks they have access to, as being corrupt, under-funded, and requiring excessive paperwork. We also find that difficulties with posting collateral and limited access to long-term financing are also correlated with high interest rates. It is likely that these latter obstacles are also aggravated by underdeveloped institutions.¹

Several papers have specifically pointed to the importance of financing obstacles. Using firm level data, Demirguc-Kunt and Maksimovic (1998) and others provide evidence on the importance of the financial system and legal enforcement in relaxing firm's external financing constraints and facilitating their growth. Rajan and Zingales (1998) show that industries that are dependent on external finance grow faster in countries with better developed financial systems.² Although these papers investigate different obstacles to firm growth and their impact, they generally focus on a small subset of broadly characterized obstacles faced by firms.

Our work is most closely related to Beck, Demirguc-Kunt, and Maksimovic (2005) but differs significantly from that study in the question being asked, the execution, and the findings. The focus of the Beck et al. study is to examine if the following three obstacles selected on a priori grounds – finance, corruption, and legal obstacles – have an effect on firm growth rates individually. Hence, the goal in that study is not to compare the obstacles to identify the most binding constraint. This is crucial since we know from our study that most obstacles when entered individually as in the Beck et al. paper are significant in the growth regressions. Our paper also differs from the Beck et al study in the methodology used since their paper does not incorporate country fixed effects (or the DAG methodology) and has limited discussion of causality issues.

This paper on the other hand looks at the full set of business environment obstacles - finance, corruption, infrastructure, taxes and regulations, judicial efficiency, crime, anti-competitive practices, policy instability/uncertainty, inflation and exchange rate - and finds finance, crime, and policy instability to be the most binding obstacles. We also find the financial sector result to be the most robust of the three binding obstacles and hence deserving of greater policy focus. Thus this paper has implications for the priority of reform efforts while the other paper does not, which is crucial for governments contemplating reform of their business environments.

A number of qualifications need to be emphasized. First, as common in the literature, in our paper we take as given the existing population of firms in each country and study the constraints they face. However, as also described by Hausman, Rodrik, and Velasco (2004), it must be noted that in a more general setting the population of firms is itself endogenous. For example, Beck, Demirguc-Kunt, and Makimovic (2006) show that

firm size distribution adapts to the business environment, and Demirguc-Kunt, Love, and Maksimovic (2006) show that certain organizational forms are better adapted to specific business environments. Nevertheless, the analysis in this paper can be seen as a way of identifying and targeting the most binding constraints for *existing* firms, conditional on having entered, but not necessarily identifying the constraints to entry. Second, this paper examines cross-country firm-level regressions and therefore does not detail the experience of any single country in depth. However we believe that having controlled for country fixed effects, we have useful - albeit not definitive - information from the cross-country set-up on the binding constraints to firm growth. Finally in the absence of panel data and firm fixed effects, we have to recognize that potential reverse causality concerns are endemic to the growth literature. We address these issues in detail using instrumental variables in the robustness section of the paper.

The paper is organized as follows. The next section describes the methodology. Section II discusses the data and summary statistics. Section III presents our main results. Section IV presents the conclusions and policy implications.

I. Methodology: Identification of Binding Constraints

Numerous studies argue that differences in business environment can explain much of the variation across countries in firms' financial policies and performance. While much of the early work relied on country-level indicators and firms' financial reports, more recent work has relied on surveys of firms which provide data on a wide range of potential obstacles to growth.³

Given the large number of potential obstacles to growth that have been identified in surveys, we face a number of difficulties in identifying the obstacles that are truly constraining. First, a potential problem with using survey data is that enterprise managers may identify several operational issues while not all of them may be constraining. Therefore, we examine the extent to which reported obstacles affect growth rates of firms. An obstacle is only considered to be a “constraint” or a “binding constraint” if it has a significant impact on firm growth. Significant impact requires that the coefficient of the obstacle in the firm growth regression be significant *and* that the enterprise managers identified the factor as an obstacle.⁴

Second, to the extent that the characteristics of a firm’s business environment are correlated, it is likely that many perceived business environment characteristics will be correlated with realized firm growth. It is important to sort these into obstacles that directly affect growth and obstacles that may be correlated with firm growth but affect it only indirectly.

Since there is no theoretical basis for classifying the obstacles, we must proceed empirically. To reduce dimensionality in a more structured way, we use the Directed Acyclic Graph (DAG) methodology. The DAG algorithm begins with a set of potentially related variables and uses the conditional correlations between them to rule out possible relations among these variables. The final output of the algorithm is a pattern of graphs listing potential relations between the variables that have not been ruled out and shows (i) variables that have direct effects on the dependent variable or other variables, (ii) variables that only have indirect effects on the dependent variable through other variables, and (iii) variables that lack a consistent statistical relation with the other

variables. If DAG identifies a particular obstacle as having a direct effect on firm growth, that obstacle would also have a significant coefficient in all OLS regressions regardless of which subset of other obstacles are entered as control variables in the regression equation. Ayyagari, Demirguc-Kunt, and Maksimovic (2005) further illustrate the use of this methodology.⁵

We also use regression analysis to do further robustness tests, such as testing for possible endogeneity bias via instrumental variable methods. We also perform other robustness tests, controlling for additional variables at the firm and country level, growth opportunities, influential observations and potential perception biases in survey responses using regression analysis.

The obstacles a firm faces depend on the institutions in each country, but are not likely to be the same for each firm in each country. Thus, our unit of analysis is the firm. As described below, the regressions have country-level fixed effects.

II. Data and Summary Statistics

The main purpose of the WBES survey is to identify obstacles to firm performance and growth around the world. Thus, the survey contains a large number of questions on the nature and severity of different obstacles. Specifically, firms are asked to rate the extent to which Finance, Corruption, Infrastructure, Taxes and Regulations, Judicial Efficiency, Crime, Anti-Competitive Practices, Policy Instability/Uncertainty, and macro issues such as Inflation and Exchange Rate constitute obstacles to their growth.⁶

In addition to the detail on the obstacles, one of the greatest values of this survey is its wide coverage of smaller firms. The survey is size-stratified, with 40 percent of

observations on small firms (defined as employing 5-50 employees), 40 percent on medium-sized firms (51-500 employees), and the remainder from large firms (>500 employees).

Insert Table 1 here

The firm level obstacles are reported in Table 1. The WBES asked enterprise managers to rate the extent to which each factor presented an obstacle to the operation and growth of their business. A rating of one denotes no obstacle; two, a minor obstacle; three, a moderate obstacle; and four, a major obstacle. Panel A of Table 1 shows that firms in high income countries tend to face lower obstacles in all areas. Panel B highlights regional differences: When it comes to Corruption and Infrastructure, African firms report the highest obstacles; Latin American Crime and Judicial Efficiency obstacles are the highest in the sample; and Financing obstacles in Asian countries are lowest in the sample of developing countries. Finally, from Panel C we see that smaller firms face higher obstacles than larger firms in all areas, except in those related to Judicial Efficiency and Infrastructure, where the ranking is reversed.

As a measure of firm performance we use firm sales growth over the past three years. We prefer to use growth as a measure of performance rather than productivity because the productivity measures are noisier and available for a much smaller sample of firms. We do not have information on other performance measures such as profits. In the Appendix Table A.1 we report firm growth and the different obstacles that firms report, averaged over all firms in each country. Firm Growth is the sales growth rate for individual firms averaged over all sampled firms in each country. Average firm growth across countries shows a wide dispersion, from negative rates of 20 percent for Armenia

and Azerbaijan to 64 percent for Malawi and Uzbekistan. Looking at average obstacles across countries we see that firms report Taxes and Regulations to be their greatest obstacle. Inflation, Policy Instability and Financing obstacles are also reported to be highly constraining. By contrast, factors associated with Judicial Efficiency and Infrastructure are ranked as the lowest obstacles faced by entrepreneurs.

The correlations among the obstacles reported by firms are significant but fairly low, with few above 0.5 (correlation matrix not shown). As expected, the two macro obstacles, Inflation and Exchange Rate, are highly correlated at 0.58. The correlations of Corruption with Crime and Judicial Efficiency are also relatively high at 0.55 each, indicating that in environments where corruption and crime are wide-spread, judicial efficiency is adversely affected. It is also interesting that the correlation between the Financing obstacle and all other obstacles is among the lowest, indicating that the Financing obstacle may capture different effects than those captured by other reported obstacles. All obstacles are negatively and significantly correlated with firm growth. We explore these relations further in the next section.

III. Firm Growth and Reported Obstacles

In this section we explore the link between the various obstacles that firms report and firm growth rates using country fixed effect regressions and DAG analysis. We find that finance, crime, and policy instability are most significantly associated with firm growth suggesting that these are the binding constraints. We find our results robust to a number of checks including variation across different firm sizes and income levels of the countries, endogeneity concerns, removal of outliers and perception biases. We also find

that of the individual financing obstacles, high interest rates are most significantly associated with firm growth. The results are discussed in detail below.

Obtaining the Binding Constraints

In Table 2 we regress firm growth rates on the different obstacles they report. All regressions are estimated with firm-level data using country-level fixed effects.⁷ The standard errors are adjusted for clustering at the country level. Specifically, the regression equations we estimate take the form:

$$\text{Firm Growth} = \alpha + \beta_1 \text{Obstacle} + \beta_2 \text{Firm Size} + \text{Country Fixed Effects} + \varepsilon \quad (1)$$

To test the hypothesis that a reported obstacle is a binding constraint, that is, it has a significant impact on firm growth, we test whether β_1 is significantly different from zero. Significant impact also requires that the obstacle has a value higher than one, which is true for all obstacles.

Insert Table 2 here

The results in Table 2 show that when we analyze individual obstacles separately, most are significantly related to firm growth. The only exceptions are Corruption, Exchange Rate, Anti-Competitive behavior, and Infrastructure obstacles which are not significantly related to firm growth. The regressions explain up to 7.4 percent of the variation in firm growth across countries. The coefficients of the significant obstacles range from 0.021 for the Judicial Efficiency obstacle to 0.032 for the Finance Obstacle. Thus, firms that say financing is a minor obstacle grow 3.2% slower than those that say finance is not an obstacle or firms that say that finance is a moderate (major) obstacle grow 3.2% slower than those that say finance is a minor (moderate) obstacle.

Alternatively, in terms of standard deviation, a one standard deviation increase in the financing obstacle decreases firm growth rate by 3.6%.

In column 11, we include all the significant obstacles in the regression equation. In this specification, only Finance, Policy Instability and Crime obstacles have a significant constraining effect on growth. Dropping the remaining obstacles from the regression (which are jointly insignificant as well) as in specification 12 shows only Finance and Crime as having a constraining effect on growth. The economic impact of the Finance obstacle is higher than that of Crime but the difference is not statistically significant.

It is also possible to do such impact evaluation at the regional level, at the country level or even at the firm level, instead of the sample mean we have used above. Looking at the mean obstacles for individual countries reported in the Appendix Table A.1, it is clear that the binding obstacles are not equally important in every country. For example, in Singapore, where the mean value of the binding obstacles are all closer to one, the economic impact of the obstacles is much smaller compared to their impact in a country such as Nigeria, where the mean value of all three obstacles are over three, indicating severe constraints. Thus, it is possible to use these cross-country results to do growth diagnostics at the country level as discussed in Hausmann et al. (2004). Going further down, there may also be some firms in Nigeria for which the constraints are not binding (depending on the value of the obstacles they report) and others in Singapore for which they are. In fact, average values of obstacles by firm size as shown in Table 1 suggests that the three obstacles will always be more binding for smaller firms compared to larger firms.

Overall, these results suggest that the three obstacles- Finance, Crime and Policy Instability – are the only true constraints, in that they are the only obstacles that affect firm growth directly at the margin. The other obstacles may also affect firm growth through their impact on each other and on the three binding constraints; however they have no direct effect on firm growth.

Have we identified the key constraints? - Robustness Checks

We use the DAG methodology to check the robustness of our regression findings since DAG is useful in simplifying the set of independent variables in a systematic way as described in Ayyagari, Demirguc-Kunt, and Maksimovic (2005).

The DAG analysis is implemented by the software program TETRAD III (Scheines, et al 1994). In keeping with common practice, we impose the following assumptions that are regularly used in the regression setting - the business environment obstacles cause firm growth, not the other way around, and the model contains all common causes of the variables in the model. To be consistent with the fixed effects specification in Table 2, we use demeaned values of the business environment obstacles where the country average of each obstacle is subtracted from the corresponding obstacle.

Figure 1 illustrates the application of this algorithm to our full sample. The input to the algorithm is the correlation matrix between firm growth and the ten demeaned business environment obstacles from the sample of 4197 firms.⁸

Insert Figure 1 here

Figure 1 shows that the only business environment obstacles that have a direct effect on firm growth are Financing, Crime and Policy Instability. Financing in turn is directly affected by the Taxes and Regulation obstacle which includes factors such as

taxes and tax administration, as well as regulations in the areas of business licensing, labor, foreign exchange, environment, fire and safety. Crime is directly affected by the Corruption obstacle and Policy Instability is affected by Corruption, Infrastructure, and Anticompetitive behavior⁹. The dashed double-headed arrows between Policy Instability and the following variables – Crime, Inflation, Taxes and Regulation, and Judicial Efficiency – indicate that the direction of orientation between Policy Instability and these variables changes between patterns.

The output also shows that relations between the obstacles themselves is quite complex and there are multiple relations in the DAG between the various business environment obstacles.¹⁰ Since the main focus of this paper is to determine the business environment obstacles that have a direct effect on growth, we do not dwell on the interactions between the different variables and leave it for future work. Hence, rather than start at the bottom and focus on the farthest variable, which is likely to have a very diluted impact on firm growth, we start at the top of the agenda and focus on the variables with direct effects which are likely to have the biggest impact on growth. Most importantly, the DAG analysis also identifies only Financing, Crime and Policy Stability as having direct effects on firm growth, as suggested by specification 11 of Table 2. As discussed in Section II, the analysis identifies direct effects after conditioning on all subsets of the other variables. This suggests that in regression analysis, Financing, Crime and Policy Instability will always have significant coefficients irrespective of the subsets of other obstacles included in the regression. Thus, these are binding constraints, and policies that relax these constraints can be expected to directly increase firm growth.

Binding Constraints and Firm Size and Level of Development

Next we explore if these relationships are different for firms of different sizes and at different levels of development. The first three columns of Table 3 include specifications that interact the three obstacles with firm size, given by the Logarithm of sales. The interaction term with the Financing obstacle is positive and significant at one percent, suggesting that larger firms are less financially constrained, confirming the findings of Beck, Demirguc-Kunt, and Maksimovic (2005). The interaction terms with Policy Instability and Crime are also positive but not significant. When we enter all the interactions together in specification (4), only the interaction term with the Financing obstacle is significant. Thus, although there is also some indication that large firms are also affected less by Crime and Policy Instability, this evidence is much weaker.

Insert Table 3 here

We also interact the three obstacles with the following country income dummies - Upper Middle Income, Lower Middle Income and Low Income. The excluded category is High Income. The results indicate that all three obstacles tend to be more constraining for middle income countries. This finding suggests that middle income countries having overcome country-specific institutional obstacles are now more constrained by a common set of obstacles pertaining to finance, crime, and policy instability. This is consistent with Gelb et al. (2007) who find that the extent to which firms complain on different obstacles differs according to the income level of the countries. The F-tests for the hypotheses that all the entered interactions are jointly equal to zero, are rejected at the one percent level of significance for Crime and Policy Instability obstacles but not for the Financing

obstacle. This suggests that firms in countries in all income groups are similarly affected by the Financing obstacle.

Checking for Reverse Causality

So far we have identified Financing, Crime, and Policy Instability as first order constraints, significantly affecting firm growth. However, the relations we observe may also be due to reverse causality. This is most likely to bias the Financing obstacle result since it is easy to imagine that entrepreneurs might complain about restricted access to external finance even in cases where access is restricted due to their own deficiencies. In the case of the Crime and Policy Instability obstacles, for reverse causality to be an issue it would have to be the case that inefficient slow growing firms blame the environment for their performance, in particular, the crime and policy instability. It is interesting however that only Financing, Crime, and Policy Instability consistently emerge as the first order constraints with the strongest association with firm growth. While reverse causality is potentially a concern it doesn't explain why poorly performing firms systematically complain most about Financing, Crime, and Policy Instability and not about the other obstacles. While there might be a causal relation between poor performance and availability of financing, which we examine using instrumental variables below, it is harder to posit a causal relation between poor performance and crime and policy instability.

As a check for reverse causality for the Street Crime and Policy Instability obstacles, we adopt the approach in Carlin, Schaffer, and Seabright (2005) who recommend checking for causality by comparing the coefficients of the fixed effects within estimator and the between estimator and test for sign changes. They argue that

since reverse causality is more likely to be significant at the firm-level, it will cause the within estimator and the between estimator to change signs.¹¹ When we run the fixed effects model using the within regression estimator on our data, we find the obstacle coefficients to be negative when entered individually. None of the coefficients are perversely positive that might have suggested reverse causality. The between effects estimator also shows the obstacle coefficients to be negative.

Furthermore, as seen in Table 1, some factors such as Taxes & Regulation are rated very highly compared to other obstacles by firms but do not appear as binding constraints whereas Street Crime which is not rated very highly (except in the case of Latin America) still emerges as one of the binding constraints. This suggests that firms may complain about many factors when surveyed but we need to control for country differences and firm heterogeneity to identify which obstacles have the largest association with firm growth.

To assess the robustness of our results, we use instrumental variable (IV) regressions (limited information maximum likelihood (LIML) estimators) to extract the exogenous component of the three obstacles. We use two sets of instruments for Financing, Crime, and Policy Instability. First, we use the average value of the obstacles for the industry groups in each country. While it is likely that individual firms may blame the different obstacles for their poor performance, it is less likely for all firms in a given country industry group to engage in such blame shifting. By instrumenting the obstacles with the average obstacle for each industry group in the country, we are isolating the exogenous part of the possibly endogenous obstacle the firm reports, and using that to predict growth. When we consider the obstacles at the country-industry level

of aggregation, the causality is likely to run from the average obstacles to individual firms, not vice versa. In addition, country-industry averages also helps us deal with potential measurement errors that are largely idiosyncratic to the firm and hence uncorrelated with average values of the obstacles. It may be noted that use of group averages as instruments is a common technique as used in Fisman and Svensson (2007) and described in Krueger and Angrist (2001). Second, we use firm responses to the survey question “*Does your firm use international accounting standards?*” A firm’s adoption of international accounting standards is likely to influence its business environment constraints, in particular the financing constraint, but is not necessarily linked to firm growth rates independently.

Insert Table 4 here

We also do the analysis at the country level averaging the obstacle variables and firm growth rates across countries. Since we are performing the analysis at the country level, we control for Log GDP/capita and do not control for any of the firm level variables. As instruments for Financing and Policy Instability obstacles we use the country’s *Common Law* dummy that takes the value 1 if the country follows Common Law tradition and three religion variables, *Protestant*, *Muslim*, and *Catholic* that each represent the percentage of population that is Protestant, Muslim or Catholic respectively in each country. As an instrument for Street Crime, we use *Common Law* dummy and the *Latitude* of a country’s capital city. A huge literature has identified the above institutional variables to be a good instrument for institutional development and hence they are not used as explanatory variables in the short term growth regressions in the second stage.

When we use country-industry averages of the obstacles as instruments (columns (1)-(3) in Panel A of Table 4) only the financing obstacle is negative and significant. The first stage F-statistic is large indicating that the country-industry average of the financing obstacle is a good instrument.¹² While the country-industry averages pass the test of instruments for policy instability and street crime, instrumenting these obstacles renders them insignificant in the regression. In addition, when we instrument all the three obstacles at once, as in column 4, we again find Financing to be the only significant constraint. This reinforces our finding that Financing is the most robust constraint of the three binding constraints.

When we use firms' adoption of international accounting standards as an instrument, we find that all three obstacles have a significant negative impact on firm growth. While the first stage F-statistics are significant in each case, it is greater than 10 only for the Financing and Crime obstacles (Stock and Watson (2003) rule of thumb for good instruments). However, the Anderson Rubin Wald Test which is the preferred test for robust inference in the weak instrument case is rejected in all three cases suggesting that all three obstacles are individually important in affecting firm growth. We do not report overidentification tests since the equation is just identified in each case in panel A.

Panel B presents cross-country regressions using historical institutional variables as instruments. Standard errors reported are robust standard errors. We find that all three obstacle variables are negative and significantly associated with firm growth. When we look at the various tests of instruments, while the first stage F-tests are significant at least at the 5% level in each case, the F-statistic is less than ten suggesting that the instruments may be weak. Hence we rely on the tests for robust inference under weak identification.

The Anderson Rubin Wald test of the null hypothesis that the obstacle coefficient is zero is rejected in all cases. In addition we also compute confidence intervals for these coefficients. Following Moreira and Poi (2001) and Mikusheva and Poi (2001) we obtain critical values of the likelihood ratio tests that yield correct rejection probabilities even when the instruments are weak. The confidence region and p-value for the coefficient on the obstacle variable based on the conditional likelihood show that the estimated coefficients belong to the confidence region. The underidentification test (Kleibergen-Paap rk Wald statistic) is rejected in each case indicating that the equation is identified and instruments pass the test of instrument relevance. The Hansen J statistic of overidentification is never rejected suggesting that the instruments used are valid instruments. In unreported results we control for a number of other country-level variables including growth rates, inflation, property rights protection, level of financial development and level of institutional development and find our results unchanged.

Overall, using different sets of instruments at the firm level and country level our results suggest that there are exogenous components of Financing, Crime and Policy Instability obstacles that predict firm growth and the results we obtain are not due to reverse causality. The IV estimations also show that finance is once again the most robust of the binding obstacles. It must be noted however that it is very difficult to find perfect instruments at the level of the firm in cross-country regressions and hence some caveats regarding the instruments are in order. The country-industry averages of the instruments could potentially be correlated with the error term so we could have systematic differences in growth rates and firm complaints across country-industry groups that raises reverse causality concerns. Regarding the use of international accounting standards as an

instrument, in the absence of panel data we are unable to use firm fixed effects and hence there is always the risk that a firm's adoption of accounting standards might be correlated with unobservables that affect firm growth. Finally, while the instruments in the country-averages regressions can be considered to be exogenous since we are using historical institutional variables, there is the possibility of omitted variable bias in the absence of country fixed effects.

Other Robustness

In this section, we describe several robustness checks of our main findings. First we investigate whether our results are driven by a few countries or firms. In particular, we investigate two sets of countries: African and Transition economies. Chandra et al. (2001) suggest that firms in African countries may exhibit different responses than the other firms in the sample. A report by the United States General Accounting Office, GAO-04-506 (2004) analyzes several firm level surveys on Africa, including the WBES, and concludes that perceptions of corruption levels vary greatly for African countries, proving a challenge for broad-based US Anticorruption Programs. Ayyagari, Demirguc-Kunt, and Maksimovic (2008) argue that Transition economies are fundamentally different from other countries in their perceptions of protection of property rights.

Insert Table 5 here

In the first four columns of Table 5 we run our preferred specification on different samples eliminating Transition and African countries. We find that while Financing and Crime are binding constraints as before, Policy Instability loses significance if we do not include these countries in the sample. These results suggest that the type of Policy

Instability present in Transition and African economies is particularly damaging to firm expansion.

We also noted that high inflation rates may be responsible for the very high firm growth rates we observe in some countries, particularly in Uzbekistan, Estonia and Bosnia-Herzegovina. However, constructing real firm growth rates and replicating all the analyses in this paper does not change the main results.

To check whether our results are driven by specific outlier firms, we eliminate firms with very high growth rates ($>100\%$). Firms reporting growth rates in excess of 100%, are typically from the Transition and African countries and it is conceivable that these firms achieve high growth rates because of political connections and are not impacted by general business environment obstacles. Thus, the experience of these firms may differ from that of the typical firm. We find that Financing remains the most binding constraint to firm growth in our reduced sample, confirming that our results are not driven by the fastest growing firms in the sample. The impact of Crime on firm growth is less robust to eliminating high growth rate firms, however.

It is also possible that young firms in the sample are affected differently by business environment obstacles. Excluding all firms younger than five years old from the sample (results not reported) leaves the Financing result unchanged, while Crime and Policy Instability are not significant in the regressions. This suggests that policy stability and controlling crime are particularly important to ensure growth of younger firms. Financing is still the main binding constraint to growth when we use robust regression analysis or quantile regressions to control for the presence of possible influential outliers.

Below we report several other robustness checks of our main findings. The tables are available on request. First, in unreported regressions we separate out the variation at the firm level and variation at the country level. That is, we incorporate both the individual firm level effect of the obstacle (i.e. the demeaned value of the obstacle which is Obstacle minus the Country average of the obstacle) and the cross-country effect (i.e. the country average of the obstacle). We find that in the full specification including the firm level and country level effects of all the ten business environment obstacles, the only individual firm level obstacles that are binding constraints to growth are Financing, Policy Instability and Crime.

We next perform various tests to detect outliers and influential points. We compute DFBETA statistics for each of the obstacle variables. The DFBETAs for regressor i measures the distance that this regression coefficient shifts when the j -th observation is included/excluded from the regression scaled by the estimated standard errors of the coefficient. None of the obstacles in our regressions have $|DFBETA| > 1$ or even the stricter cutoff of $|DFBETA| > 2\sqrt{N}$ as suggested by Besley, Kuh, and Welsch (1980). This implies that our results are not driven by influential observations. Financing and Crime have a significant negative effect on firm growth while Policy Instability is insignificant.¹³

We then control for growth opportunities using average industry growth or firm level dependence on external finance. The observed association between obstacles and firm growth might occur because firms that face higher obstacles are also those that face limited growth opportunities. Our results remain unchanged using either measure of growth opportunities. Financing, Policy Instability and Street Crime come in significant

when entered individually and when entered together, only Financing and Street Crime are significant.

In unreported regressions, we also investigated whether firm ownership drives our results. The sample includes 203 firms with government ownership. Excluding these firms leaves the Financing and Crime results unchanged. The sample also includes 1340 firms with over 50 percent foreign ownership. Excluding these foreign firms from the analysis leaves only the Financing obstacle significant. This suggests that foreign owned firms are particularly sensitive to Policy Instability and Crime. Including dummy variables to control for government and foreign firms also leads to similar results in that only Financing and Crime are significant.

Finally, we check if our results are robust subject to controlling for perception biases. Following Kaufmann and Wei (1999), we construct two kvetch variables, Kvetch1 and Kvetch2, which are deviations of each firm's response from the mean country response to two general survey questions. Kvetch1 uses the responses to the question "*How helpful do you find the central government today towards businesses like yours?*" and Kvetch2 is constructed using the responses to "*How predictable are changes in economic and financial policies?*" Since higher values correspond to unfavorable responses, positive deviations from the country mean indicate pessimism whereas negative deviations indicate optimism. Controlling for differences in perceptions using the kvetch variables leaves only Financing and Crime results unchanged. Policy Instability remains insignificant.

Individual Financing Obstacles

Our results indicate that Financing is one of the most important obstacles that directly constrain firm growth. We would like to get a better understanding of exactly what type of obstacles related to financing are constraining firm growth. Fortunately, our survey data also includes more detailed questions regarding the Financing obstacles.

To get at specific issues, the entrepreneurs were asked to rate the extent to which the following financing factors represent an obstacle to their growth: (i) collateral requirements of banks and financial institutions, (ii) bank paperwork and bureaucracy, (iii) high interest rates, (iv) need for special connections with banks and financial institutions, (v) banks lacking money to lend, (vi) access to foreign banks, (vii) access to non-bank equity, (viii) access to export finance, (ix) access to financing for leasing equipment, (x) inadequate credit and financial information on customers, and (xi) access to long-term loans. The ratings are again on a scale of one to four, increasing in the severity of obstacles.

Insert Table 6 here

Table 6 reports the regressions that parallel those in Table 2, but this time focusing on specific financing obstacles. In addition to the individual financing obstacles, we also include a residual, the component of the general financing obstacle not explained by the individual obstacles. The results indicate that not all financing obstacles reported by firms are constraining. Only the coefficients of collateral, paperwork, high interest rates, special connections, banks' lack of money to lend, lease finance and the residual are significant when entered individually. In terms of economic impact high interest rates has the highest impact – a one standard deviation increase in the obstacle

results in a decrease in firm growth by 3.3 percent. Unlike the different obstacles we examined above, specific financing obstacles are highly correlated with each other. In specification 13 we include all obstacles that are significant when entered individually, and find that only the high interest rates coefficient is significant, although only at the 10% level. If we also include the residual as in specification 14, only the residual remains significant. The residual is likely to summarize how different firms are affected differently by the structure and ownership of the financial system, the level of competition and other factors which are not fully captured by the specific financial obstacles thus proxying for general access to credit.¹⁴

When we look at the correlations among obstacles using DAG analysis (not shown), we find that high interest rates is the only financial obstacle directly constraining firm growth. It may be noted that while we restrict the direction of causation to be from the various financing obstacles to growth, we impose no ordering amongst the individual financing obstacles themselves. The finding that high interest rates constrains firm growth is not surprising since the high interest rate obstacle captures the cost of financing and is itself an endogenous variable that depends on the ability of the financial system to satisfy the demand for capital. It can be expected to constrain all firms in all countries. Collectively, specific financing obstacles still do not capture everything measured by the general financing obstacle, as illustrated by the effect of the residual. This also suggests that the general access to credit is an important constraint for firms.

The DAG analysis also suggests that perceptions of high collateral requirements of banks and financial institutions and paperwork influence the perceptions of high interest rates. High interest rates also influence perceptions of lack of access to lease

finance, banks lacking money to lend, as well as the need for special connections in banking. In unreported results we also ran regressions of the high interest rate obstacle on individual financing obstacles. Specific financing obstacles are all individually correlated with high interest rates. When we consider all financing obstacles together, only collateral, paperwork, special connections, lack of money to lend, and access to long term loans are correlated with high interest rates, as in the DAG analysis.

IV. Conclusions and Policy Implications

We use firm level survey data for 80 countries to investigate which features of the business environment are the most constraining for firm growth. Specifically, we examine factors such as taxes and regulations, judicial efficiency, infrastructure weaknesses, and financing issues that have attracted significant attention in the literature. Although firms report many obstacles to their growth, not all of them are equally constraining – in that they either affect firm growth only indirectly through their influence on other factors, or not at all. Using regressions as well as Directed Acyclic Graph (DAG) methodology, we find that only Finance, Crime and Policy Instability are binding constraints, which have a direct association with the growth rate of firms. Thus, while other obstacles we study in this paper are also associated with firm growth, through their impact on each other and on direct obstacles, maintaining policy stability, keeping crime under control, and undertaking financial sector reforms to relax financing constraints are likely to be the most effective routes to promote firm growth. We also find that the Financing obstacle's impact on growth is robust to varying samples of countries while the Policy Instability and Crime results are less robust to the exclusion of

Transition and African countries where they might be the most problematic for business growth. We subject our results to a battery of robustness tests including changes in sample, controlling for reverse causality, growth opportunities and potential perception biases in survey responses. We find the financing obstacle to be the most robust to all these tests. This is further confirmed through instrumental variable regressions. This suggests that financial sector reform should be a priority for governments contemplating reform of their business environments.¹⁵

Further investigation of the Financing obstacles reveals the importance of high interest rates in constraining firm growth. This result highlights the importance of macroeconomic policies in influencing growth at the firm level as indicated by the correlation between high interest rates and banks' lack of money to lend. Furthermore, high interest rates are also correlated with high collateral and paperwork requirements, the need for special connections with banks and unavailability of long term loans. These results suggest that bureaucracy and corruption in banking, greater collateral requirements and lack of long term loans are common in high interest rate environments. In addition to the cost of financing, we also find that general access to credit is an important constraint to firm growth. We leave further investigation of country and firm level determinants of financing obstacles to future work.

Appendix Table A.1: General Obstacles

			General Obstacles									
Nation	Firm Growth	Number of firms	Financing	Policy Instability	Inflation	Exchange Rate	Judicial Efficiency	Street Crime	Corruption	Taxes and Regulation	Anti-competitive Behavior	Infrastructure
Albania	0.22	103	3.04	3.48	2.75	2.61	2.69	3.42	3.34	3.15	2.72	3
Argentina	0.08	82	3.01	3.07	1.77	1.73	2.27	2.39	2.58	3.34	2.41	1.93
Armenia	-0.2	96	2.45	2.87	2.73	2.69	1.5	1.85	1.96	3.39	1.9	1.77
Azerbaijan	-0.2	70	3.11	2.55	2.9	2.61	2.59	2.39	3	3.17	2.96	2.43
Bangladesh	0.13	34	2.6	3.08	2.86	3.09	2.38	3.07	3.61	3.03	2.4	
Belarus	0.1	97	3.33	2.95	3.63	3.16	1.55	2.17	1.88	3.34	1.99	1.7
Belize	0.12	26	2.81	2.38	2.04	1.73	1.56	2.12	1.96	2.77	1.96	2.19
Bolivia	0.04	80	3.03	3.1	2.58	2.46	2.78	2.76	3.56	3.15	2.71	2.63
Bosnia & Herzegovina	0.63	76	3.09	3.19	1.33	1.25	2.54	1.86	2.56	3.16	2.58	2.65
Botswana	0.32	72	2.24	1.55	1.93	1.33		1.88	1.65	1.89		2.16
Brazil	0.03	148	2.67	3.53	2.8	2.94	2.56	2.83	2.53	3.66	2.49	2.18
Bulgaria	0.15	101	3.16	3.03	2.76	2.37	2.26	2.64	2.64	3.1	2.34	2.23
Cambodia	0.07	298	2.04	2.9	2.61	2.32	2	3.29		2.23	2.21	2.33
Cameroon	0.12	44	3.14	2.03	2.03	2.28		2.94	3.36	2.7		3.44
Canada	0.17	74	2.1	2.18	2.15	2.16	1.47	1.32	1.4	2.59	1.62	1.41
Chile	0.09	81	2.36	2.58	2.16	2.59	1.97	2.4	1.86	2.36	1.91	1.86
China	0.05	70	3.36	2.1	2.23	1.83	1.5	1.83	1.94	2.03	2.13	1.89
Colombia	0.06	83	2.67	3.49	3.01	3.34	2.4	3.37	2.87	3.17	2.33	2.46
Costa Rica	0.25	81	2.62	2.67	2.93	2.75	2.2	2.89	2.52	2.8	2.44	2.63
Cote d'Ivoire	0.05	47	2.78	2.85	2.37	1.97		3.29	3.24	2.49		2.29
Croatia	0.1	97	3.26	3.11	2.47	2.86	2.74	2.09	2.59	3.34	2.04	1.94
Czech Republic	0.1	80	3.18	2.95	3	2.46	2.18	2.09	2.1	3.44	2.16	2.5
Dominican Republic	0.21	95	2.63	3.02	2.85	2.88	2.43	3.22	3	3.96	2.75	2.63
Ecuador	-0.06	74	3.27	3.6	3.76	3.78	3.04	3.49	3.53	3.07	2.55	2.67
Egypt, Arab Rep.	0.16	44	2.91	3.14	2.68	2.9		2.24	3.14	3.43		3.23
El Salvador	-0.02	73	2.93	2.97	3.16	2.55	2.65	3.67	3.06	2.93	2.36	2.52
Estonia	0.63	109	2.47	2.62	2.41	1.89	1.72	2.09	1.88	2.67	1.85	1.64
Ethiopia	0.26	70	3.02	2.38	2.26	2.47		1.51	2.46	2.33		3.04

			General Obstacles									
Nation	Firm Growth	Number of firms	Financing	Policy Instability	Inflation	Exchange Rate	Judicial Efficiency	Street Crime	Corruption	Taxes and Regulation	Anti-competitive Behavior	Infrastructure
France	0.2	62	2.61	2.2	2.03	1.82	1.79	1.77	1.62	3.13	2.02	1.81
Georgia	0.14	78	3.29	2.84	3.29	2.94	1.86	2.32	3.04	3.22	2.18	2.14
Germany	0.11	60	2.59	1.63	1.87	1.64	2.12	1.56	1.88	3.17	2.3	1.71
Ghana	0.19	58	3.1	2.37	3.43	2.58		2.37	2.78	2.83		2.74
Guatemala	0.18	84	2.99	3.16	3.32	3.6	2.5	3.22	2.7	2.75	2.28	2.52
Haiti	0	62	3.28	3.18	2.92	2.9	2.35	3.81	3.08	2.73	3.1	3.89
Honduras	0.1	65	2.97	2.53	3.41	3.3	2.41	3.23	2.9	2.83	2.79	2.56
Hungary	0.28	98	2.6	2.61	2.59	1.6	1.32	1.76	1.95	3.01	2.14	1.53
India	0.15	152	2.59	2.81	2.77	2.42	2.02	1.98	2.8	2.43		2.8
Indonesia	-0.05	70	2.83	3.14	3.21	3.4	2.26	2.69	2.69	2.59	2.96	2.37
Italy	0.16	64	1.97	2.97	2.23	1.83	2.22	2.22	1.76	3.25	2.19	2.24
Kazakhstan	0.1	89	3.29	2.88	3.62	3.48	2.08	2.6	2.7	3.37	2.55	2.1
Kenya	0.03	70	2.76	3.03	2.8	1.75		3.27	3.56	2.53		3.64
Kyrgyz Republic	0	68	3.47	3.23	3.78	3.48	2.13	3.26	3.19	3.59	3	1.98
Lithuania	0.08	68	3.03	2.27	2.3	1.91	2.25	2.52	2.44	3.26	2.31	1.82
Madagascar	0.16	67	3.08	2.67	3.32	2.3		2.79	3.44	2.75		3.03
Malawi	0.64	30	2.81	2.2	3.56	2.54		3.08	2.65	2.37		3.76
Malaysia	0.01	37	2.57	2.14	2.44	1.94	1.63	1.78	2	2.03	1.91	1.92
Mexico	0.24	71	3.24	3.27	3.48	3.13	2.77	3.37	3.31	3.21	2.75	2.23
Moldova	-0.15	84	3.42	3.6	3.86	3.51	2.51	3.11	2.93	3.58	2.93	2.64
Namibia	0.3	52	2	1.66	2.08	2.08		1.96	1.71	1.98		1.63
Nicaragua	0.21	76	3.05	2.91	3.39	3.07	2.33	2.8	2.88	2.96	2.42	2.71
Nigeria	0.26	63	3.11	3.43	3.21	2.92		3.3	3.37	3.1		3.68
Pakistan	0.05	61	3.28	3.64	3.21	2.87	2.56	3.03	3.54	3.2	2.67	3.08
Panama	0.09	81	2.06	2.72	2.04	1.42	2.4	2.98	2.8	2.38	2.44	2.19
Peru	-0.02	83	3.09	3.21	2.85	2.99	2.55	2.81	2.83	3.35	2.68	2.27
Philippines	0.07	84	2.69	2.85	3.36	3.43	2.24	2.8	3.13	3.08	2.9	2.88
Poland	0.33	175	2.47	2.75	2.58	2.27	2.3	2.37	2.27	3.08	2.23	1.67
Portugal	0.12	52	1.8	2.08	2.1	1.74	1.88	1.64	1.73	2.15	2.18	1.75

			General Obstacles									
Nation	Firm Growth	Number of firms	Financing	Policy Instability	Inflation	Exchange Rate	Judicial Efficiency	Street Crime	Corruption	Taxes and Regulation	Anti-competitive Behavior	Infrastructure
Romania	0.07	96	3.26	3.44	3.75	3.19	2.59	2.45	2.88	3.57	2.52	2.44
Russian Federation	0.29	384	3.2	3.49	3.53	3.15	2.17	2.65	2.62	3.58	2.67	2.12
Senegal	0.15	38	3	2.21	2.56	2		2.61	3.04	2.97		2.88
Singapore	0.12	74	1.97	1.5	1.61	1.88	1.32	1.22	1.28	1.55	1.58	1.42
Slovak Republic	0.14	91	3.34	1.53	3.13	2.43	2.13	2.49	2.47	3.25	2.26	1.98
Slovenia	0.29	101	2.3	2.6	2.23	2.21	2.29	1.68	1.64	2.91	2.43	1.74
South Africa	0.26	87	2.34	1.97	2.45	2.39		3.58	2.58	2.64		1.83
Spain	0.25	66	2.21	2.17	2.27	1.93	1.97	1.92	2.08	2.65	2.25	1.94
Sweden	0.23	73	1.83	2.46	1.66	1.78	1.46	1.54	1.18	2.67	1.97	1.52
Tanzania	0.25	40	2.85	2.48	2.65	2.07		1.96	2.88	2.7		3.21
Thailand	-0.02	337	3.1	3.49	3.4	3.62	2.13	3.48	3.47	3.54	3.6	2.76
Trinidad and Tobago	0.18	80	3.03	1.81	2.49	2.41	1.45	2.18	1.68	2.78	1.79	2.1
Tunisia	0.14	41	1.79	1.94	1.7	1.94		1.55	2.11	2.12		2.1
Turkey	0.1	115	3.12	3.55	3.61	2.83	2.3	2.09	2.89	3.16	2.79	2.22
Uganda	0.18	67	3.17	2.47	2.68	1.78		2.27	2.93	2.48		2.81
Ukraine	0.03	170	3.45	3.22	3.43	3.05	2.16	2.49	2.51	3.7	2.86	2.22
United Kingdom	0.27	62	2.33	2.19	2.16	2.28	1.5	1.95	1.24	2.87	1.72	1.69
United States	0.16	66	2.38	2.05	2.12	1.71	1.84	2.14	1.88	2.39	1.7	1.83
Uruguay	0	72	2.73	2.61	2.03	2.39	1.91	2.07	2	3.21	1.71	1.9
Uzbekistan	0.64	94	2.77	2.03	3.04	2.6	1.68	1.77	2.22	2.66	2.28	1.95
Venezuela	-0.02	78	2.62	3.64	3.48	3.12	2.65	3.18	3	3.1	2.63	2.31
Zambia	0.18	46	2.95	2.57	3.45	1.88		3.18	2.78	2.39		3.07
Zimbabwe	0.47	91	3.05	2.73	3.83	2.93		2.57	2.87	2.87		2.53
Average	0.15	86.73	2.8	2.72	2.76	2.49	2.15	2.51	2.56	2.9	2.37	2.34

Note: The variables are described as follows: Firm growth is the percentage change in firm sales over the past three years (1996-99). Financing, Policy Instability, Inflation, Exchange Rate, Judicial Efficiency, Street Crime, Corruption, Taxes and Regulation, Anti-competitive Behavior and Infrastructure are general obstacles as indicated in the firm questionnaire. They take values 1 to 4, with higher values indicating greater obstacles. Firm obstacles are averaged over all firms in each country. The number of firms reported are the firms with non-missing firm growth rates.

Source: Authors' analysis based on data described in the text.

¹ Fleisig (1996) highlights the problem with posting collateral in developing and transition countries with the example of financing available to Uruguayan farmers raising cattle. While cattle are viewed as one of the best forms of loan collateral by the US, a pledge on cattle is worthless in Uruguay. Uruguayan law requires for specific description of the pledged property, in this case, an identification of the cows pledged. The need to identify collateral so specifically undermines the secured transaction since the bank is not allowed to repossess a different group of cows in the event of nonpayment.

² There is a parallel literature on financial development and growth at the country level. Specifically, cross-country studies (King and Levine 1993; Beck, Levine, and Loayza 2000; Levine, Loayza, and Beck 2000) show that financial development fosters economic growth. Also see Levine (2005) for a review of the finance and growth literature.

³ See Dollar, Hallward-Driemeier, and Mengistae (2004), Gelb, Ramachandran, Shah, and Turner (2007), Carlin, Schaffer, and Seabright (2005) and Svejnar and Commander (2007).

⁴ In the survey managers indicate that an obstacle is a problem by assigning a value greater than one, on a four point scale to that obstacle. The significance of the coefficient in the growth regression is usually sufficient to determine whether an obstacle is binding or not since the mean value of all obstacles exceeds one. However, in determining the relative impact, it is important to take into account the level of the obstacles.

⁵ DAG analysis is related to the use of different analytical methods to identify the most reliable predictors of economic growth such as the Extreme Bounds Analysis (EBA) used in Kormendi and Meguire (1985), Barro (1991), and Levine and Renelt (1992) and the technique in Sala-i-Martin (1997). DAG analysis has several advantages over these methods. While these methods start from an equation specified by the researcher, that embodies a causal ordering which is then tested, DAG can endogenously discover the causal ordering. Moreover, whereas EBA treats one relation at a time, the graphs produced by DAG show robust relations between all the variables being analyzed, taking into account the implications of robust relations elsewhere in the system on the ordering in a specific relation.

⁶ The survey provides two obstacles on crime, one capturing street crime and the other organized crime. Since the correlation between the two obstacles is higher than 70 percent, we use only street crime in our analysis, which is also more strongly correlated with firm growth among the two.

⁷ In unreported regressions we also checked the robustness of our results to including additional control variables in the regression. Specifically, adding variables at the firm level capturing a firm's industry, number of competitors, organizational structure, and whether it is government or foreign owned, an exporter, or a subsidy receiver reduces country coverage from 80 to 56, but does not affect the results significantly for individual obstacles. Of the three binding constraints identified above, only the Policy Instability obstacle loses significance. We get similar results with country random effects controlling for GDP/Capita and inflation at the country level.

⁸ In addition, we select the significance level for the tests of conditional independence performed by TETRAD. Because the algorithm performs a complex sequence of statistical tests, each at the given significance level, the significance level is not an indication of error probabilities of the entire procedure. Spirtes, Glymour, and Sheines (1993) after exploring several versions of the algorithm on simulated data conclude that "in order for the method to converge to correct decisions with probability 1, the significance level used in making decisions should decrease as the sample size increases, and the use of higher significance levels may improve performance at small sample sizes." For the results in this paper obtained from samples ranging from 2659-4197 observations, we use a significance level of 0.10. At the 5% significance level, Finance, Crime, and Policy Instability have a direct effect on firm growth where as at the 1% level only Finance and Crime have a direct effect on growth.

⁹ We find the DAG analysis and the set of causal structures determined by the algorithm as being useful for an objective selection of variables, with the heuristic interpretation that if DAG analysis shows that obstacle X causes obstacle Y, then firms' reports of X as an obstacle is also likely to affect the probability that they report of Y as an obstacle. For details refer to formal definitions.

¹⁰ In addition to the directed arrows and bi-directional arrows, Figure 1 also shows that in some cases common latent causes drive association between some variables (e.g. financing and corruption) and in other cases, the direction of orientation is inconsistent i.e. some statistical tests indicate that an edge should be oriented as $x1 \rightarrow x2$, and other statistical tests indicate that it should be oriented as $x1 \leftarrow x2$.

¹¹ Carlin, Schaffer, and Seabright (2005) argue that only in the case of the financing constraint, reverse causality makes the within coefficient more negative than the true value, thus making this method inapplicable

¹² This is further confirmed by the Weak Identification test statistic (Kleibergen-Paap Wald statistic) which is much larger than the critical value of 16.38

¹³ In unreported results we also computed the DFITS statistic of Welsch and Kuh (1977) which identifies the influence of each observation on the fitted model. Besley, Kuh, and Welsch (1980) suggest that a cutoff of $|DFITS_j| > 2\sqrt{k/N}$ indicates influential observations where k is the number of estimated coefficients and N is the number of observations. We have 145 observations in our sample with $|DFITS|$ greater than the cutoff value. When we drop these influential observations we find that Financing, Policy Instability, and Crime are all negative and significant

¹⁴ The residual remains significant if in addition to the residual and the significant individual financing obstacles (collateral, paperwork, high interest rates, special connections, lack money to lend and lease finance), we were to include all the general obstacles (Policy Instability, Crime, Inflation, Exchange rates, Taxes & Regulation, Anti-Competitive Behavior, Judicial Efficiency, Corruption and Infrastructure).

¹⁵ An implicit assumption with the use of any survey data is that firm managers are knowledgeable about the different obstacles and understand the true workings of the financial and legal systems.

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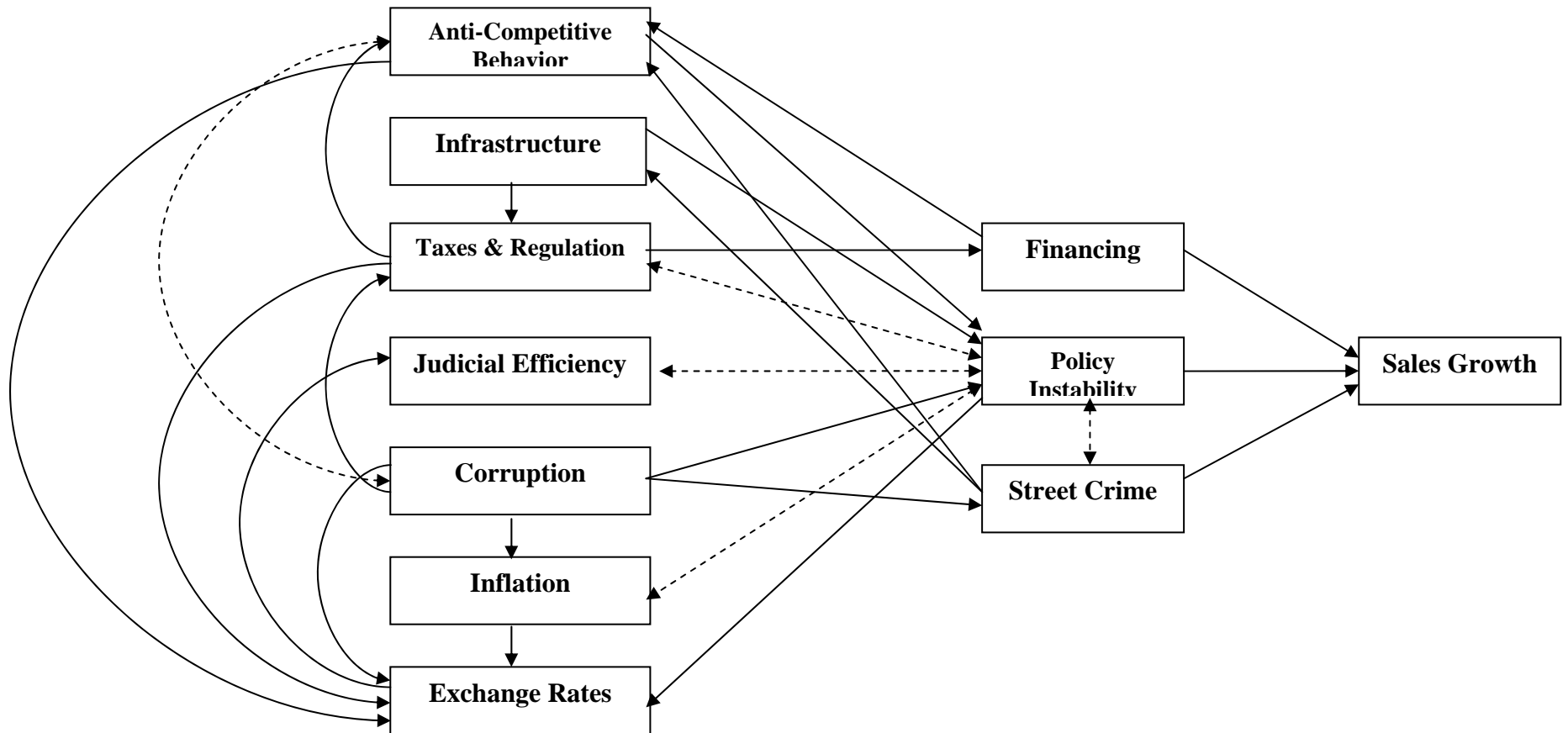
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Figure 1: Firm Growth – General Obstacles: DAG Analysis



Source: Authors' analysis based on data described in text.

Table 1: Economic Indicators and General Obstacles

Panel A: Averaged Across Countries

Nation	GDP per capita	Firm Growth	General Obstacles									
			Financing	Policy Instability	Inflation	Exchange Rate	Judicial Efficiency	Street Crime	Corruption	Taxes and Regulation	Anti-competitive Behavior	Infrastructure

Panel A: Averaged Across Country Income Groups

High (N=11)	21376.34	0.19	2.19	2.2	2.04	1.93	1.81	1.71	1.59	2.67	2	1.72
Upper-Middle (N=18)	4131.817	0.19	2.75	2.62	2.54	2.27	2.13	2.38	2.29	2.93	2.18	1.99
Lower-Middle (N=26)	1984.852	0.11	3	3.14	3.1	2.94	2.31	2.72	2.73	3.24	2.59	2.31
Low Income (N=25)	435.3	0.14	2.85	2.84	3.02	2.61	2.15	2.78	2.98	2.73	2.53	2.7

Panel B: Averaged Across 5 Geographic Regions

Europe and North America (N=9)	22863.72	0.19	2.2	2.22	2.06	1.89	1.79	1.78	1.63	2.77	1.98	1.76
Latin America (N=20)	3022.2	0.09	2.83	3.02	2.84	2.8	2.39	2.95	2.74	3.01	2.43	2.4
Asia (N=10)	2772.52	0.05	2.59	2.82	2.74	2.66	1.99	2.62	2.71	2.51	2.44	2.43
Transition (N=23)	2417.02	0.19	3.05	2.99	3.06	2.7	2.17	2.39	2.5	3.28	2.44	2.09
Africa (N=18)	1115.81	0.23	2.77	2.43	2.75	2.21		2.64	2.80	2.32		2.75

Panel C: Averaged Across 3 Size Groups

Small	3759.33	0.13	2.89	2.84	2.90	2.59	2.13	2.64	2.62	2.94	2.43	2.24
Medium	4377.98	0.16	2.86	2.87	2.84	2.60	2.18	2.46	2.53	3.00	2.41	2.26
Large	4365.68	0.17	2.54	2.75	2.65	2.55	2.19	2.49	2.43	2.70	2.23	2.36

Note: The variables are described as follows: GDP per capita is real GDP per capita in US dollars averaged over 1995-1999. Firm growth is the percentage change in firm sales over the past three years (1996-99). Financing, Policy Instability, Inflation, Exchange Rate, Judicial Efficiency, Street Crime, Corruption, Taxes and Regulation, Anti-competitive Behavior and Infrastructure are general obstacles as indicated in the firm questionnaire. They take values 1 to 4, with higher values indicating greater obstacles. In Panel A, the countries are classified into High Income, Upper Middle Income, Lower Middle Income and Low Income group countries according to WDI and firm variables are averaged over all firms in the particular group of countries. In Panel B, the countries are classified into five geographic regions and firm variables are averaged over all firms in the particular geographic region. In Panel C, firm variables are averaged across three size groups-Small, Medium and Large Firms.

Source: Authors' analysis based on data described in text.

Table 2: Firm Growth-Impact of Obstacles

	1	2	6	3	8	5	7	4	9	10	11	12
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
Constant	0.205*** (0.028)	0.165*** (0.036)	0.193*** (0.034)	0.170*** (0.029)	0.180*** (0.040)	0.140*** (0.026)	0.152*** (0.032)	0.117*** (0.029)	0.111*** (0.028)	0.126*** (0.030)	0.332*** (0.059)	0.297*** (0.047)
Size	0.003 (0.002)	0.005** (0.003)	0.004 (0.002)	0.004 (0.002)	0.005* (0.003)	0.005* (0.003)	0.005* (0.003)	0.003 (0.002)	0.005* (0.003)	0.005* (0.003)	0.004 (0.003)	0.004 (0.002)
Financing	-0.032*** (0.008)										-0.034*** (0.009)	-0.028*** (0.008)
Policy Instability		-0.024** (0.010)									-0.022* (0.013)	-0.014 (0.009)
Street Crime			-0.030** (0.013)								-0.033** (0.015)	-0.025* (0.014)
Inflation				-0.020** (0.009)							-0.002 (0.011)	
Tax Regulation					-0.027** (0.012)						0.001 (0.013)	
Judicial Efficiency						-0.021** (0.010)					-0.003 (0.009)	
Corruption							-0.017 (0.011)				0.011 (0.012)	
Exchange Rates								-0.000 (0.009)				
Anti-Competitive Behavior									-0.004 (0.007)			
Infrastructure										-0.009 (0.008)		
N	6235	6133	5964	6175	6343	5142	5620	6068	5091	6205	4551	5778
NCountries	79	79	79	79	79	61	78	79	60	79	59	78
Adjusted. R-sq	0.07	0.073	0.07	0.068	0.069	0.07	0.072	0.069	0.069	0.068	0.074	0.072

*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively.

Note: The regression equation estimated is: Firm Growth = $\alpha + \beta_1$ Size + β_2 Financing + β_3 Policy Instability + β_4 Inflation + β_5 Exchange Rates + β_6 Judicial Efficiency + β_7 Street Crime + β_8 Corruption + β_9 Taxes and Regulation + β_{10} Anti-competitive Behavior + β_{11} Infrastructure + β_{12} Country Fixed Effects + e. The variables are described as follows: Firm Growth is the percentage increase in firm sales over the past three years. Firm Size is the Log of firm sales. Financing, Policy Instability, Inflation, Exchange Rate, Judicial Efficiency, Street Crime, Corruption, Taxes and Regulation, Anti-competitive Behavior and Infrastructure are general obstacles as indicated in the firm questionnaire. They take values 1 to 4, where 1 indicates no obstacle and 4 indicates major obstacle. In specifications (1) to (10), each of the obstacle variables is included individually. Specification 11 includes all the obstacles that were significant in (1) to (10) together where as in specification 12 only Financing, Policy Instability and Street Crime obstacles are entered. All regressions in specifications 1-12 are estimated using country fixed effects with clustered standard errors.

Source: Authors' analysis based on data described in text.

Table 3: Firm Growth-Interaction Effects

	Interaction with Firm Size				Interaction with Country Income Dummies			
	1	2	3	4	1	2	3	4
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
Constant	0.278*** (0.050)	0.218*** (0.061)	0.225*** (0.058)	0.421*** (0.089)	0.207*** (0.029)	0.177*** (0.039)	0.184*** (0.030)	0.299*** (0.046)
Firm Size	-0.004 (0.004)	-0.000 (0.004)	-0.000 (0.004)	-0.009 (0.006)	0.004 (0.002)	0.005* (0.003)	0.004 (0.002)	0.004 (0.002)
Financing	-0.058*** (0.016)			-0.053*** (0.015)	-0.002 (0.013)			-0.004 (0.015)
Financing*Size	0.003*** (0.001)			0.003** (0.001)				
Financing*Upper Middle					-0.041* (0.023)			-0.034 (0.022)
Financing*Lower Middle					-0.041** (0.019)			-0.027 (0.019)
Financing*Low Income					-0.016 (0.019)			-0.019 (0.022)
Policy Instability		-0.042** (0.020)		-0.024 (0.019)		0.008 (0.012)		0.014 (0.012)
Policy Instability*Size		0.002 (0.001)		0.001 (0.001)				
Policy Instability*Upper Middle						-0.056*** (0.021)		-0.045** (0.018)
Policy Instability*Lower Middle						-0.055** (0.024)		-0.043* (0.025)
Policy Instability*Low Income						0.005 (0.019)		-0.008 (0.017)
Street Crime			-0.042* (0.024)	-0.034 (0.025)			-0.010 (0.014)	-0.014 (0.014)
Street Crime*Size			0.001 (0.001)	0.001 (0.002)				
Street Crime*Upper Middle							-0.021 (0.026)	-0.010 (0.025)
Street Crime*Lower Middle							-0.052** (0.025)	-0.039 (0.027)
Street Crime*Low Income							0.039* (0.021)	0.044** (0.020)

	Interaction with Firm Size				Interaction with Country Income Dummies			
	1	2	3	4	1	2	3	4
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
N	6235	6133	5964	5778	6235	6133	5964	5778
NCountries	79	79	79	78	79	79	79	78
Adjusted R-Square	0.071	0.074	0.071	0.074	0.070	0.075	0.073	0.075
F-Test of Interactions				0.0503	0.1184	0.0088	0.0039	0.0022

*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively

Note: The regression equation estimated is: $\text{Firm Growth} = \alpha + \beta_1 \text{Size} + \beta_2 \text{Financing} + \beta_3 \text{Policy Instability} + \beta_4 \text{Street Crime} + \beta_5 \text{Financing} \times \text{Income Dummies} + \beta_6 \text{Financing} \times \text{Size} + \beta_7 \text{Policy Instability} \times \text{Income Dummies} + \beta_8 \text{Policy Instability} \times \text{Size} + \beta_9 \text{Street Crime} \times \text{Income Dummies} + \beta_{10} \text{Street Crime} \times \text{Size}$. The variables are described as follows: Firm Growth is the percentage increase in firm sales over the past three years. Firm Size is the log of sales. Financing, Policy Instability and Street Crime are general obstacles as indicated in the firm questionnaire. They take values 1 to 4, where 1 indicates no obstacle and 4 indicates major obstacle. Income dummies are country dummies created on the basis of income level of the country. High Income Dummy takes the value 1 for countries belonging to the high income group and 0 otherwise, Upper Middle Income dummy takes the value 1 for countries belonging to the upper middle income group and 0 otherwise, Lower Middle Income dummy takes the value 1 for countries belonging to the lower middle income group and 0 otherwise, Low Income dummy takes the value 1 for low income group countries and 0 otherwise. In specifications (1) to (3) in each panel, the obstacle variables and its interactions is included individually. Specification 4 in both panels includes the full model. All regressions are estimated using country fixed effects with clustered standard errors. Each specification also reports the p-value of the joint significance test of the interaction terms.

Source: Authors' analysis based on data described in text

Table 4: Robustness Test-Instrumental Variables

Panel A: Firm Level Regressions

	1	2	3	4	5	6	7
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
<i>Instrument(s)</i>	Country-Industry Average of the obstacle variable				Does the firm follow international accounting standards?		
Size	0.002 (0.002)	0.006*** (0.002)	0.004* (0.002)	0.003 (0.002)	-0.004 (0.004)	0.011* (0.006)	-0.005 (0.005)
Financing	-0.066*** (0.025)			-0.067** (0.028)	-0.285*** (0.101)		
Policy Instability		-0.045 (0.029)		-0.041 (0.031)		-0.897* (0.499)	
Street Crime			-0.011 (0.029)	0.014 (0.032)			-0.529** (0.232)
N	6235	6133	5964	5778	5846	5747	5592
First Stage Test of Excluded Instruments							
F-Stat (Financing)	382.32 (0.0000)			112.13 (0.0000)	36.48 (0.0000)		
F-Stat (Policy Instability)		334.57 (0.0000)		106.44 (0.0000)		4.66 (0.0309)	
F-Stat (Crime)			351.30 (0.0000)	110.22 (0.0000)			11.11 (0.0009)
Underidentification Test	549.12	405.91	453.67	366.18	35.90	4.54	11.20
Kleibergen-Paap rk Wald statistic	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0331)	(0.0008)
Weak Instrument Robust Inference	7.06	2.41	0.14	3.55	9.43	9.82	9.18
Anderson Rubin Wald Test	(0.0079)	(0.1205)	(0.7041)	(0.0138)	(0.0021)	(0.0017)	(0.0024)

Panel B: Cross-country regressions

	1	2	3
	Firm Growth	Firm Growth	Firm Growth
<i>Instruments</i>	<i>Common law dummy, 3 religion dummies</i>	<i>Common law dummy, 3 religion dummies</i>	<i>Common law dummy, Latitude</i>
Constant	2.385** (1.013)	1.122*** (0.344)	1.206*** (0.465)
GDP/Capita	-0.091**	-0.031*	-0.052*

	1	2	3
	Firm Growth	Firm Growth	Firm Growth
<i>Instruments</i>	<i>Common law dummy, 3 religion dummies</i>	<i>Common law dummy, 3 religion dummies</i>	<i>Common law dummy, Latitude</i>
	(0.043)	(0.016)	(0.029)
Financing	-0.556** (0.255)		
Policy Instability		-0.270*** (0.093)	
Street Crime			-0.264*** (0.102)
N	79	79	80
F-Stat	2.71 (0.0365)	6.44 (0.0002)	6.95 (0.0017)
Underidentification Test	11.74	27.86	14.63
Kleibergen-Paap rk Wald statistic	(0.0194)	(0.0000)	(0.0007)
Weak Instruments Robust Inference			
Anderson Rubin Wald Test	3.30 (0.0154)	3.30 (0.0154)	6.69 (0.0021)
Moreira and Poi Conditional Likelihood Ratio Test	[-2.264438, -.2134783] (0.9857)	[-.5691154, -.1152336] (0.9207)	[-.7257177, -.0849116] (0.9832)
Overidentification Test of all Instruments	0.966	1.227	0.562
Hansen J Statistic	(0.8094)	(0.7465)	(0.4535)

*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively

Note: Two stage instrumental variable regressions are used. In Panel A, the first stage regression equation estimated is Financing (or Policy Instability or Street Crime) = $\alpha + \gamma_1$ Country Fixed Effects + γ_2 Firm Size + γ_3 Instrument. The second stage regression equation estimated is: Firm Growth = $\alpha + \beta_1$ Country Fixed Effects + β_2 Firm Size + β_3 Financing (predicted value from first stage) + β_4 Policy Instability (predicted value from first stage) + β_5 Street Crime (predicted value from first stage). In specifications (1)-(4), the instrument used is the average value of the obstacle across each industry in each country. In specifications (5)-(7), the instrument used is firm response to the variable "Does the firm adopt international accounting standards?"

Panel B reports cross-country regressions with robust standard errors. The first stage regression equation estimated is Financing (or Policy Instability or Street Crime) averaged across countries = $\alpha + \gamma_1$ Common Law dummy + γ_2 Latitude + γ_3 Protestant + γ_4 Catholic + γ_5 Muslim + γ_6 GDP/Capita + e. The second stage regression equation estimated is: Firm Growth = $\alpha + \beta_1$ GDP/Capita + β_2 Financing (predicted value from first stage) + β_3 Policy Instability (predicted value from first stage) + β_4 Street Crime (predicted value from first stage). The variables are described as follows: Firm Growth is the percentage increase in firm sales over the past three years. Firm Size is the Log of Sales. GDP/capita is log of real GDP per capita in US\$. Financing, Policy Instability, and Street Crime are general obstacles as indicated in the firm questionnaire. They take values 1 to 4, where 1 indicates no obstacle and 4 indicates major obstacle. English Common Law is a dummy variable that takes the value 1 for Common Law Countries. Latitude is the absolute value of the latitude of the country scaled between zero and one. Protestant, Catholic, and Muslim variables are the percentage of protestant, catholic and muslim religions in each country from La Porta et al. (1997). Does the firm adopt international accounting standards is a dummy variable that takes value 1 if the firm adopts international accounting standards and 0 otherwise.

Source: Authors' analysis based on data described in text.

Table 5: Robustness Test -Varying Samples

	High Growth Firms Included				High Growth Firms Excluded				
	Countries Excluded				Countries Excluded				
	Transition Economies	African economies	African and Transition Economies	Uzbekistan, Bosnia & Herzegovina, Estonia	None	Transition Economies	African economies	African and Transition Economies	Uzbekistan, Bosnia & Herzegovina, Estonia
	1	2	3	4	5	6	7	8	9
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
Constant	0.227*** (0.045)	0.307*** (0.045)	0.233*** (0.045)	0.226*** (0.041)	0.172*** (0.028)	0.225*** (0.039)	0.175*** (0.029)	0.236*** (0.042)	0.165*** (0.028)
Firm Size	-0.000 (0.002)	0.005 (0.003)	0.000 (0.002)	0.004 (0.003)	0.003 (0.002)	0.001 (0.002)	0.003 (0.002)	0.000 (0.002)	0.003 (0.002)
Financing	-0.012* (0.006)	-0.033*** (0.008)	-0.020*** (0.007)	-0.019*** (0.007)	-0.018*** (0.005)	-0.017*** (0.006)	-0.020*** (0.005)	-0.022*** (0.006)	-0.016*** (0.005)
Policy Instability	-0.007 (0.008)	-0.015* (0.009)	-0.010 (0.008)	-0.008 (0.008)	-0.015*** (0.005)	-0.011 (0.007)	-0.015** (0.006)	-0.010 (0.008)	-0.014*** (0.005)
Street Crime	-0.016** (0.007)	-0.027*** (0.008)	-0.020*** (0.007)	-0.021*** (0.007)	-0.007 (0.005)	-0.018*** (0.006)	-0.008 (0.005)	-0.020*** (0.007)	-0.009* (0.005)
N	3224	5236	2682	5534	5631	3202	5107	2678	5421
NCountries	54	62	38	75	78	54	62	38	75
Adjusted R-Square	0.073	0.072	0.056	0.053	0.086	0.074	0.082	0.068	0.084

*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively

Note: The regression equation estimated is: Firm Growth = $\alpha + \beta_1$ GDP/capita + β_2 Size + β_3 Financing + β_4 Policy Instability + β_5 Street Crime. The variables are described as follows: Firm Growth is the percentage increase in firm sales over the past three years. GDP/capita is log of real GDP per capita in US\$. Firm Size is the Log of firm sales. Financing, Policy Instability, and Street Crime are general obstacles as indicated in the firm questionnaire. They take values 1 to 4, with where 1 indicates no obstacle and 4 indicates major obstacle. Specifications (1) to (4) exclude certain countries from the full sample of firms while specifications (5) to (9) exclude the countries from a reduced sample which does not include firms reporting very high/low) growth rates (>+/-100%). All regressions are estimated using country fixed effects with clustered standard errors.

Source: Authors' analysis based on data described in the text

Table 6: Firm Growth-Impact of Individual Financing Obstacles

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
Constant	0.180*** (0.031)	0.172*** (0.029)	0.211*** (0.033)	0.132*** (0.030)	0.166*** (0.034)	0.158*** (0.028)	0.129*** (0.040)	0.129*** (0.039)	0.106*** (0.034)	0.122*** (0.036)	0.121*** (0.039)	0.094*** (0.032)	0.264*** (0.040)	0.212*** (0.048)
Firm Size	0.003 (0.003)	0.004 (0.002)	0.004 (0.003)	0.005 (0.003)	0.004 (0.003)	0.004 (0.003)	0.004 (0.003)	0.005 (0.003)	0.005* (0.003)	0.004 (0.003)	0.005* (0.003)	0.006* (0.003)	0.002 (0.003)	0.005 (0.003)
Collateral	-0.023*** (0.007)												-0.006 (0.010)	-0.008 (0.011)
Paperwork		-0.025*** (0.009)											-0.010 (0.010)	-0.015 (0.011)
High Interest Rates			-0.032*** (0.010)										-0.020* (0.011)	-0.011 (0.012)
Special Connections				-0.015** (0.007)									-0.001 (0.010)	-0.002 (0.014)
Lack Money to lend					-0.024*** (0.008)								-0.011 (0.009)	-0.007 (0.012)
Lease Finance						-0.015 (0.009)								
Access to foreign banks							-0.002 (0.007)							
Access to non-bank equity								-0.005 (0.008)						
Export Finance									0.004 (0.009)					
Credit										0.003 (0.007)				
Long Term Loans											-0.008 (0.008)			

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth	Firm Growth
Financing Residual												-0.022** (0.011)		-0.023** (0.011)
N	6024	6133	6298	6002	5808	5076	5093	5037	4440	5332	5030	2988	5317	2988
NCountries	79	79	79	79	79	78	78	78	78	78	60	58	79	58
Adj. R-sq	0.070	0.069	0.070	0.064	0.074	0.070	0.065	0.070	0.071	0.072	0.068	0.006	0.071	0.065

*, **, and *** indicate significance levels of 10, 5, and 1 percent respectively

Note: The regression equation estimated is: Firm Growth = $\alpha + \beta_1$ Size + β_2 Collateral + β_3 Paperwork + β_4 High Interest Rates + β_5 Special Connections + β_6 Lack money to lend + β_7 Access to foreign banks + β_8 Access to non-bank equity + β_9 Export finance + β_{10} Lease finance + β_{11} Credit + β_{12} Long Term Loans + β_{13} (Residual). The variables are described as follows: Firm Growth is the percentage increase in firm sales over the past three years. Firm Size is the Log of Sales. Collateral, Paperwork, High Interest Rates, Special Connections, Lack money to lend, Access to foreign banks, Access to non-bank equity, Export finance, Lease finance, Credit, Long Term Loans are individual financing obstacles as indicated in the firm questionnaire. They take values 1 to 4, with where 1 indicates no obstacle and 4 indicates major obstacle. In specifications (1) to (11), each of the obstacle variables is included individually. Residual is the residual from a regression of the General Financing Obstacle on all the individual financing obstacles. Specification 13 includes Collateral, Paperwork, High Interest Rates, Special Connections, Lack money to lend, and Lease Finance. Specifications 12 and 14 include the Financing Residual. All regressions are estimated using country fixed effects with clustered standard errors.

Source: Authors' analysis based on data described in the text.